

INYO HULSEA

Hulsea vestita ssp. *inyoensis* (Keck) Wilken

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Management Status: Federal: None

California: G5T2T3, S1.2 (CDFG, 1998)

CNPS: List 2, RED 2-2-1 (Skinner and Pavlik, 1994)

General Distribution:

Inyo hulsea occurs in eastern California (Inyo and Mono Counties) and southwestern Nevada (Nye County). The only verified California locations are in the Coso, Panamint, and Inyo Mountains (Inyo County) and Lower Rock Creek Canyon (Mono County). It also occurs (CNDDDB occurrence 6, based on M. French Gilman specimen 1821, US National Herbarium) in the Grapevine Mountains of Death Valley National Monument, though this location is near the Nevada border and may actually be in Nye County, Nevada. The Mono County report (CNDDDB occurrence no. 1, California Dept. of Fish and Game, 1997b) had been unverified until recently, but has been confirmed in the field and is supported by a specimen (*Ingram s.n.* SBBG; Dieter Wilken, pers. comm.). Another Mono County report, CNDDDB occurrence no. 7, is based on a misidentified specimen (*G. Helmkamp s.n.* UCR). California locations are generally from sites that are inaccessible and poorly collected due to harsh climate and topography, few roads or trails, and administrative prohibitions against access and/or collecting (e.g., China Lake Naval Weapons Center and Death Valley National Park). In Nevada, Inyo hulsea occurs from the North and Central Belted Ranges to the Eleanor Range (Kartesz, 1987). Elevation ranges from 4600 - 7300 ft. (1400 - 2230 m) (Bagley, 1985); both these extremes are for Nevada locations.

Distribution in the West Mojave Planning Area:

The only known Inyo hulsea record within the WMPA is based on a Coso Mountains specimen collected by Frederick V. Coville and Funston (935, US National Herbarium) and reported by Coville (1893). Wilken (1975) cited the specimen as “representative” of the subspecies. California Dept. of Fish and Game (1997b; CNDDDB occurrence 5) reports the location as Crystal Spring at 5640 ft. elevation, citing the herbarium label. Coville’s published report (1893: p. 254) includes the remark that it was collected “in the cañon next south of Crystal Spring” and indicates its elevation as 6070 ft. (1850 m).

This site is the southwesternmost known Inyo hulsea occurrence. The plant is likely to occur elsewhere in mountains of the northernmost part of the WMPA, particularly within China Lake Naval Air Weapons Station.

Natural History:

Inyo hulsea has been treated as a full species (*H. inyoensis*); a subspecies of San Diego sunflower (*H. californica* ssp. *inyoensis*); and as a synonym of *H. vestita* ssp. *callicarpa*. Munz (1968) explained its distinction from *H. californica*, and Wilken (1975) explained its placement in *H. vestita*. Cronquist (1994) felt that it was indistinguishable from *H. vestita* ssp. *callicarpa*, endemic to the San Jacinto and Palomar Mountains in southern California, some 170 miles (270 km) distant from the southernmost Inyo hulsea location. While Wilken (1975) found that it hybridized more readily with *H. vestita* ssp. *callicarpa* than with other *H. vestita* subspecies, the distinction between the two taxa is unambiguous, at least for specimens housed at Rancho Santa Ana Botanic Garden. Wilken (1975; 1993) and Kartesz (1987) have described characters readily distinguishing it from this and other *H. vestita* subspecies. The conspicuous and numerous ray flowers are the most distinctive characters.

Inyo hulsea is an herbaceous perennial with one to several erect stems, generally about 15 in. (0.4 m) but up to about 27 in. (0.7 m) tall. Its leaves are green, on long petioles, occurring in a basal group and part way up the stem; the basal leaves are lobed. Bracts are, at most, only slightly woolly. Flower heads are generally two to several per stem. The disc and ray flowers are yellow. There are generally

18 or more rays, each one about 0.5-0.8 in. (12-18 mm) long. The fruit is an achene about 0.3 in. (7.5 mm) long. Commonly lower stature, generally leafless stem, densely woolly bracts, and fewer and shorter ray flowers distinguish the related *H. vestita* ssp. *vestita*, which may overlap in the western part of its range. Inyo hulsea's ray flowers are longer (0.5-0.8 in. [12-18 mm]) and sometimes more numerous (18-32) and than those of *H. vestita* ssp. *callicarpa* (0.2-0.4 in. [6-10 mm]; 16-25). Ranges of the two subspecies as treated by Wilken (1975) do not overlap, though Cronquist (1994) treated the two as synonyms, under *H. vestita* var. *callicarpa*.

Skinner and Pavlik (1994) report Inyo hulsea flowering from April through June. Nevada references (Kartesz, 1987; Cronquist, 1994) report it flowering from May through October. Beatley (1976) reported it flowering May through July and, in some years, to September and October. Based on these dates, it seems to be primarily a spring-flowering species, but evidently also responds to late season thundershowers.

Little additional information is available. All *Hulsea* species are self-incompatible (Wilken 1975). Flower morphology suggests a generalist insect pollinator. Seed dispersal, mycorrhizal associates, population fluctuations over time, and other aspects of Inyo hulsea natural history are unknown.

Habitat Requirements:

Inyo hulsea occurs primarily on steep, unstable sandy or rocky slopes and sometimes washes in high desert shrublands and pinyon woodlands. Associated species include big sagebrush (*Artemisia tridentata*), saltbush (*Atriplex* spp.), rabbitbrush (*Chrysothamnus nauseosus*), single-needle pinyon (*Pinus monophylla*), and antelope brush (*Purshia tridentata*). Some occurrences are on road cuts or other disturbed sites and it "appears to thrive on disturbed soil" (Mozingo and Williams, 1980). Its occurrence on open, unstable sites suggests that Inyo hulsea may be intolerant of shade, or may compete poorly for water or other soil resources. It generally occurs on "white tuff bedrock" (Beatley, 1976) but has been collected on a variety of substrates (Bagley, 1985), suggesting that it has no specialized edaphic requirements. This and other *Hulsea vestita* subspecies often occur on nutrient-poor soils, including coarse granitic sand, pumice, and limestone. Occurrence in these soils suggest either low nutrient requirements or very effective nutrient-acquisition mechanisms.

Population Status:

Inyo hulsea populations are uncommon and widely scattered, but the plants may be numerous or even common at any one site. For example, Mary DeDecker reported it "plentiful in immediate area" on the label of her Panamint Mountains specimen (2492 RSA). Kartesz (1987) described it as "restricted but locally common" and "rare" but "probably more common than reported in Nevada." Its occurrence on steep, inaccessible mountain slopes suggests that many populations are yet to be discovered, particularly where access is limited by land management agencies.

Efforts by Mark Bagley to relocate the Coso Mountains site, the only known occurrence within the WMPA, have been unsuccessful, perhaps due to poor rainfall during the years when he searched for it (Mark Bagley, pers. comm.).

Threats Analysis:

The type locality was reportedly degraded by highway maintenance work in 1989 (Skinner and Pavlik 1994), but there are no known threats affecting Inyo hulsea over wide portions of its range. It is tolerant and even thrives with certain human disturbances that evidently create soil conditions similar to its natural habitat. This tolerance does not suggest that it is invariably disturbance-tolerant. There is a wide range of human-associated soil disturbances, and the specific disturbance characteristics favoring Inyo hulsea are unknown.

Biological Standards:

The Coso Mountains location is the only known report within the WMPA, but the taxon evidently has not been seen or collected at the site since 1891. Regular visits to the Coso Mountains should be made to search for the plant at the historic location and in suitable habitat in the surrounding area.

Potential effects to Inyo hulsea should be considered for any project site in the northern part of the WMPA above about 4600 ft. (1400 m) elevation. Project sites should be surveyed in advance of soil

disturbance, following recommendations and methods described by Nelson (1994). In particular, surveys should be completed during spring, and should be "floristic in nature." Careful surveys in suitable habitat would likely lead to the discovery of new Inyo hulsea populations. New populations should be vouchered and reported to the CNDDDB to assure that permanent, verifiable records are available. Collectors should be certain to include sufficient representative material so that ray flower number and length can be compared with descriptions of Inyo hulsea and *H. vestita* ssp. *callicarpa*.

No management standards for Inyo hulsea within the WMPA can be recommended without confirmation that the historic Coso Mountains population is still extant, and new data (e.g., either new occurrences or negative results from carefully conducted surveys of suitable habitat within its geographic and elevational ranges). Management conflicts should be minimal since it occurs primarily on poorly accessible high mountain slopes.

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